CLAIMS

1. A substrate (1) provided over at least part of its surface with a coating having photocatalytic and/or hydrophilic properties, ***characterized in that*** it is combined with a device (2) for distributing the water over said coated surface.

2. A substrate (1) as claimed in claim 1, ***characterized in that*** it involves an architectural material of the walling, cladding, flat roofing, glazing type.

3. The substrate (1) as claimed in claim 1, ***characterized in that*** it involves a transparent substrate.

4. The substrate (1) as claimed in claim 1, ***characterized in that*** it is made of a glass, a ceramic, a glass-ceramic, a flexible or rigid organic polymer and is preferably transparent.

5. The substrate (1) as claimed in one of the preceding claims, ***characterized in that*** the coating is photocatalytic and comprises at least partially crystallized titanium oxide in the anatase form.

6. The substrate (1) as claimed in claim 5, ***characterized in that*** the coating also comprises another mineral, especially in the form of at least one oxide, in particular an amorphous or partially crystallized oxide and chosen from silicon oxide, titanium oxide, tin oxide, zirconium oxide and aluminum oxide.

7. The substrate (1) as claimed in one of claims 1 to 4, ***characterized in that*** the coating is hydrophilic and comprises an at least partially

oxidized silicon derivative, chosen in particular from silicon oxide which is stoichiometric or substoichiometric in oxygen, silicon oxycarbide and/or silicon oxynitride.

8. The substrate (1) as claimed in one of the preceding claims, ***characterized in that*** the device (2) for distributing water comprises at least one spray rail capable of emitting discontinuous water streams (3) or a sheet of water in the direction of the coated surface of the substrate.

9. The substrate (1) as claimed in one of the preceding claims, ***characterized in that*** it involves a glazing unit provided on one of its outer faces with at least one photocatalytic and/or hydrophilic coating, which is arranged in a nonhorizontal plane and combined with a device for distributing water comprising a water spray rail (2) capable of emitting a curtain of water or discontinuous water streams in the direction of the top part of the coated face of the substrate, so that the water runs down over said face down to the bottom part.

10. The substrate (1) as claimed in claim 9, ***characterized in that*** the water spray rail (2) is placed in or close to the roller shutter casing of the glazing unit.

11. The substrate (1) as claimed in one of the preceding claims, ***characterized in that*** it is also combined with a device capable of collecting the water once it has flowed over the coated surface of said substrate, in particular in the form of a gutter.

12. The substrate (1) as claimed in one of the preceding claims, ***characterized in that*** the water

distribution device, and possibly the water collection device, is secured to said substrate by mechanical means.

13. The substrate (1) as claimed in one of the preceding claims, ***characterized in that*** the distribution of water is automatically triggered periodically and/or is controlled manually and/or is regulated by electronic/computing means.

14. The substrate (1) as claimed in one of the preceding claims, ***characterized in that*** all or part of the distributed water contains additives of the surfactant or degreasing agent type.

15. The substrate (1) as claimed in claim 14, ***characterized in that*** the water distribution comprises at least two consecutive spray steps, in particular a step with water containing additives of the surfactant or degreasing agent type and a step with additive-free water.

16. A method of "reactivating" photocatalytic and/or hydrophilic coatings placed on the surface of substrates (1), especially transparent substrates of the glazing type, ***characterized in that*** the water is distributed periodically on the surface of said coatings.

17. The method as claimed in claim 16, ***characterized in that*** the water is distributed so as to cause a stream of water over the entire surface of the coating.

18. The method as claimed in claim 16 or claim 17, ***characterized in that*** the water is distributed by means of at least one water spray rail (2) which is capable of emitting discontinuous water streams (3) or a continuous curtain of water directed

toward the coated surface, especially so that the water flows from the top downward of said surface located in a nonhorizontal plane.

19. The method as claimed in claim 18, ***characterized in that*** the water is distributed automatically, according to a given periodicity, and/or by manual control.

20. The method as claimed in one of claims 16 to 19, ***characterized in that*** the distribution of water is regulated, in particular its periodicity and its flow rate, by taking into account a number of parameters such as the level of fouling of the coating or the ambient pluviometry.

21. The method as claimed in one of claims 16 to 20, ***characterized in that*** the water is distributed according to spray cycles comprising at least two consecutive sprayings, in particular one step with the water containing additives of the surfactant or degreasing agent type and a step with additive free water.

22. The use of the substrate according to one of claims 1 to 15 in order to decrease the frequency of cleaning of said substrate and/or decreasing its clogging by mineral fouling.

PATENT

SUBSTRATE WITH PHOTOCATALYTIC AND/OR HYDROPHILIC COATING

ABSTRACT

The subject of the invention is a substrate (1) provided over at least part of its surface with a coating having photocatalytic and/or hydrophilic properties. The substrate is combined with a device (2) for distributing water over said coated surface.

The subject of the invention is also the method of implementing this combination.

Figure for abstract: 1

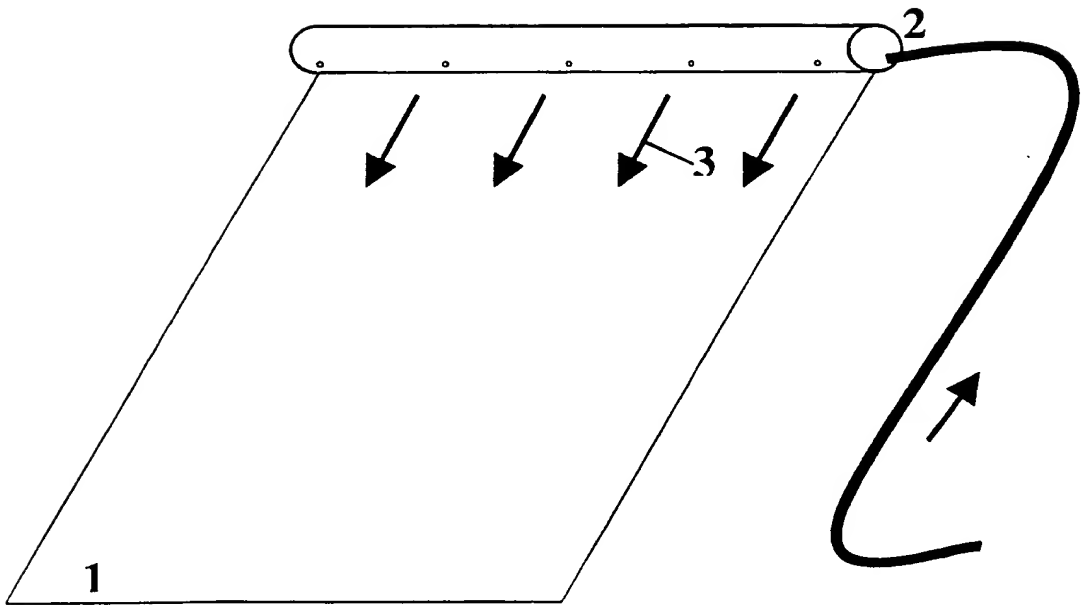

FIG-1

CLAIMS

1. Substrate comprising a fibrous material which is provided, over at least a portion of its surface and/or within its thickness, with a coating with photocatalytic properties comprising a semi-conducting material with photocatalytic properties of the oxide or sulphide type, in particular titanium oxide at least partially crystallized in anatase form, the said material being used in combination with a promoter of adhesion to the said fibrous material.

2. Substrate according to Claim 1, **characterized in that** the semi-conducting material of the titanium oxide type is introduced into the coating in the form of particles in colloidal suspension or in the form of a powder.

3. Substrate according to either of the preceding claims, **characterized in that** the titanium oxide originates from the thermal decomposition of organometallic or metal halide precursor(s) within the coating.

4. Substrate according to one of the preceding claims, **characterized in that** the adhesion promoter is organic, inorganic or organic/inorganic hybrid, single- or multicomponent.

5. Substrate according to one of the preceding claims, **characterized in that** the adhesion promoter comprises a silicon-comprising component of the silane, silicone or siloxane type.

6. Substrate according to one of the preceding claims, **characterized in that** the adhesion promoter comprises one or more organic polymers, in particular acrylic polymers or fluorinated polymers, optionally in combination with additives belonging to the family of the antioxidants and/or of the ultraviolet absorbers and/or of the stabilizers of the "HALS" type.

7. Substrate according to one of the preceding claims, **characterized in that** the adhesion promoter comprises at least one metal oxide of the TiO_2 or SiO_2

type originating from the thermal decomposition of silicon-comprising, organometallic or metal halide precursor(s) within the coating.

8. Substrate according to ~~one of the preceding~~ claims, **characterized in that** the adhesion promoter comprises at least one inorganic component chosen from aluminium phosphates and potassium or calcium aluminosilicates.

9. Substrate according to ~~one of the preceding~~ claims, **characterized in that** the adhesion promoter forms part of the binder making possible the cohesion of the fibrous material, in particular of the sizing type for mineral wool or sizing type for reinforcing strands or binder type for a mat obtained from reinforcing strands.

10. Substrate according to ~~one of the preceding~~ claims, **characterized in that** the mineral fibrous material comprises mineral wool of the insulation type and/or glass strands of the reinforcing type.

11. Substrate according to ~~one of the preceding~~ claims, **characterized in that** the fibrous material is organized in the web, felt, mould, paper or bulk material form.

12. Substrate according to ~~one of the preceding~~ claims, **characterized in that** the coating with photocatalytic properties sheaths at least a portion of the fibres of the fibrous material over a thickness of at least 5 nm, in particular of between 30 and 50 nm.

13. Process for the manufacture of the substrate according to ~~one of the preceding~~ claims, **characterized in that** the coating with photocatalytic properties is deposited in the liquid phase on the production line for the fibrous material, in particular between the fiberizing devices, of the centrifuging dish, device for fiberizing by external centrifuging, device for fiberizing by mechanical drawing, device for fiberizing by air blowing or device for fiberizing by steam blowing type, and the devices for receiving the fibres, optionally before, with or after the deposition of the

binder in the liquid phase of the fibres to one another, of the sizing composition type.

14. Process for the manufacture of the substrate according to ~~one of~~ Claims 1 ~~to 12~~, **characterized in that** the coating with photocatalytic properties is deposited in the liquid phase on the production line for the fibrous material downstream of the devices for receiving the fibres resulting from the fiberizing devices, in particular before the optional heat treatment/conditioning devices of the stove type.

15. Process for the manufacture of the substrate according to ~~one of~~ Claims 1 ~~to 12~~, **characterized in that** the coating with photocatalytic properties is deposited in the liquid phase on the production line or outside the production line for the fibrous material during the operation of conversion of the latter into the finished product, in particular during the operation of conversion of blankets of reinforcing strands into mats.

16. Process for the manufacture of the substrate according to ~~one of~~ Claims 1 to ~~12~~, **characterized in that** the coating with photocatalytic properties is deposited in the liquid phase on the finished fibrous material and then the said material is subjected to a heat treatment.

17. Process according to ~~one of~~ Claims 13 ~~to 16~~, **characterized in that** the coating is deposited in the fluid phase, in particular the liquid phase, by spraying, coating or dip coating.

18. Application of the substrate according to ~~one of~~ Claims 1 ~~to 12~~ to thermal/sound insulation materials or to liquid or gas filters, purifiers or diffusers, in order to confer on them dirt-repellent, fungicidal, bactericidal, algicidal or odour-controlling properties.

PATENT

SUBSTRATE WITH A PHOTOCATALYTIC COATING

Applicant: SAINT-GOBAIN RECHERCHE

ABSTRACT

The subject-matter of the invention is a substrate comprising a fibrous material which is provided, over at least a portion of its surface and/or within its thickness, with a coating with photocatalytic properties comprising a semi-conducting material with photocatalytic properties of the oxide or sulphide type.

Another subject-matter of the invention is its process of manufacture and its applications.

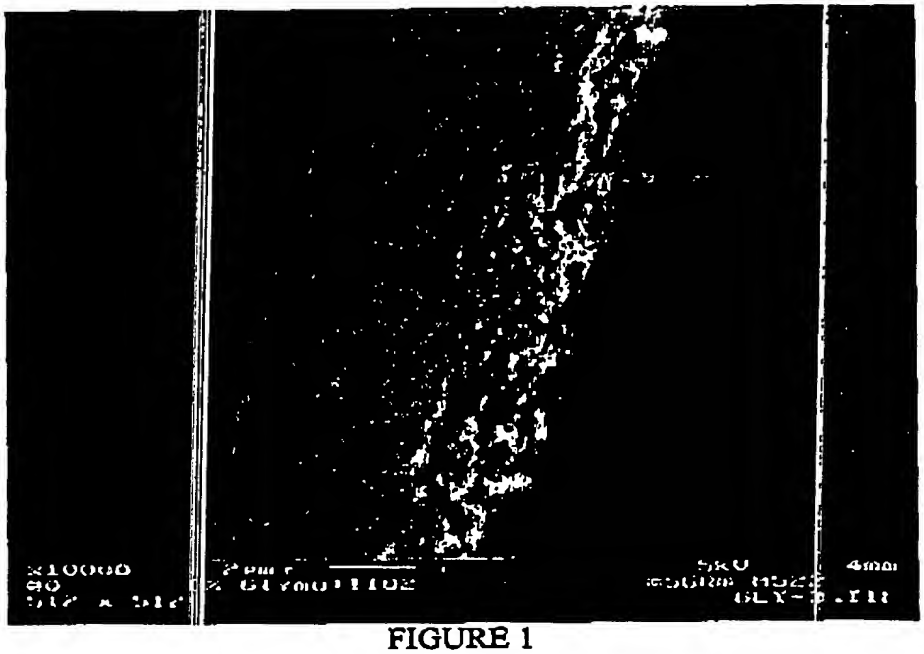

FIGURE 1

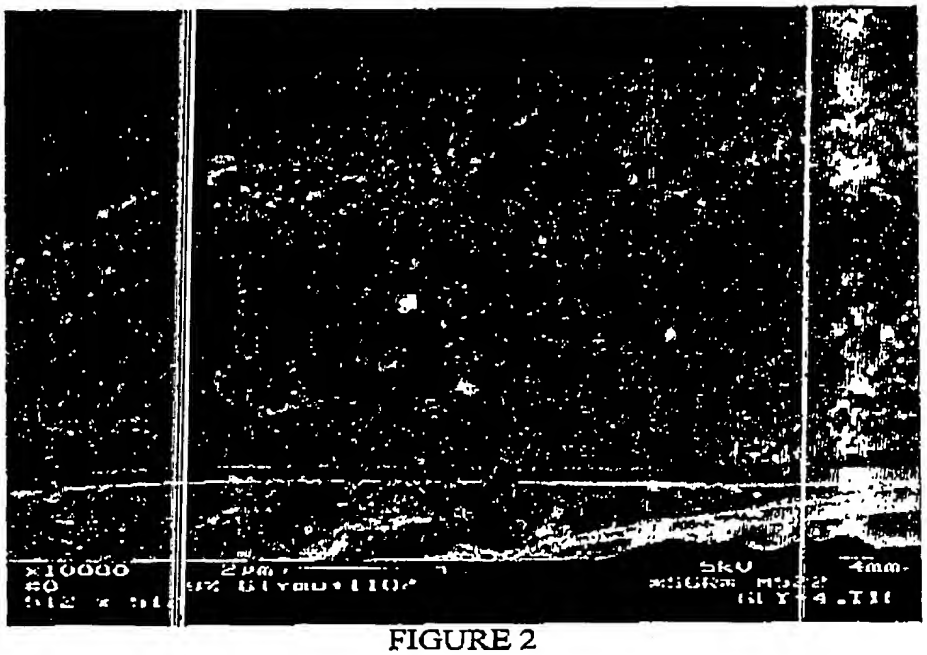

FIGURE 2

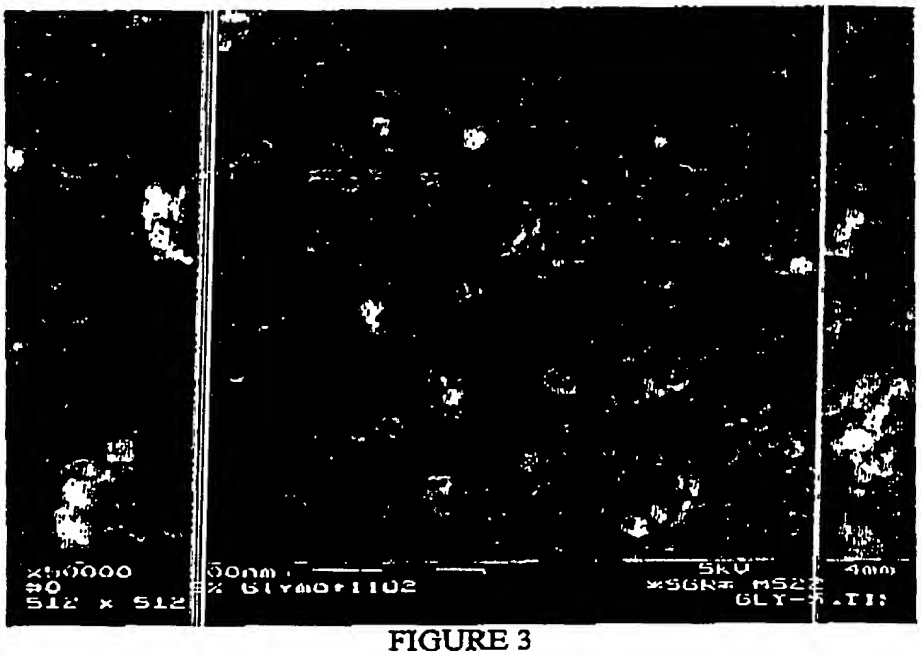

FIGURE 3